

Comparison of Commuters' Satisfaction and Preferences with Public Transport: A Case of Wagon Service in Lahore

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ABSTRACT

This study aims at making a comparison between different modes' users for satisfaction and preferences with public transportation by taking wagon service in Lahore as a case study. A questionnaire survey was conducted, and structural models were developed for satisfaction with wagon and preferences to use public transportation. Structural model of satisfaction shows that commuters' satisfaction has positive relationship with the improvement of symbolic and functional factors of wagon service. However, increase in cost and time factors tends to decrease satisfaction level. Similarly, symbolic and functional factors of service quality have positive influence on people's preferences to use public transportation. The results of comparative structural modeling revealed that there is significant difference for standardized estimates of structural equations between different mode users. The models of public transport and motorcycle users have more resemblance with the base model of satisfaction which implies that perceptions of current public transport and potential users are adequate for evaluation of service quality of public transport modes. Moreover, it is found that variation exists between different modes' users for preferences to use public transportation. The findings would be helpful in improving the service quality of wagon service according to satisfaction and preferences of different modes' users.

KEYWORDS: Public transportation, Para-transit, Commuters' satisfaction, Service quality, Lahore.

INTRODUCTION

The rapid increase in urban population and automobile ownership and usage have resulted in urban transportation problems in developing countries. In developing countries, most of the cities are facing problems of achieving the appropriate standard of urban mobility. Mobility is an important element of a community and it is mainly dependent on automobile in most of the developing countries. Non-motorized

transport, which was the common mode to link different places in earliest times, has been replaced largely by cars in daily mobility, and by trucks for freight movement (Fjellstrom, 2002). The insufficient and/or inefficient transit facilities tend to generate more automobile usage, and thus shape the cities as auto-dependent cities. Moreover, transportation policies in developing countries support the use of private vehicles. The situation in developing countries has become very complex in handling the increased travel demand of passengers. Public transport system needs to become market-oriented and competitive in all aspects

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in order to reduce usage of private vehicles (Beirao and Cabral, 2007). It requires improvements in service quality of public transportation modes. To make necessary improvements in public transportation, it is required to evaluate service quality level of existing public transportation modes (e.g., bus service, para-transit,... etc.) based on public perceptions. In developing countries, most of para-transit modes such as wagon or minibus can meet the specific needs of the passengers. For example, such mid size vehicles can operate in narrow streets and they can stop wherever the passenger might require (Okamura *et al.*, 2011). It is essential to evaluate the potential of such para-transit modes such as wagon service in a specific region. Moreover, only few studies in developing countries provide evidence of using structural equation modeling techniques to assess the commuters' perceptions to service quality of public transportation mode and to explore the factors responsible for their effectiveness (Githui *et al.*, 2010; Joewono *et al.*, 2005; Joewono *et al.*, 2010; Zhang *et al.*, 2005). Therefore, this study aims to evaluate satisfaction of commuters with wagon service and preferences to use public transportation. It also makes a comparison between different segments of travel market for satisfaction and preferences. A factor analysis was conducted and three factors extracted of commuters' satisfaction with service quality of wagon service. Using the results of factor analysis, structural models were developed of satisfaction and preferences for different groups. This paper is organized in the following manner. The next section briefly describes the socio-economic and public transportation characteristics of Lahore. Then, data collection methods have been described, followed by an elaboration of results of commuters' satisfaction and preferences. The key findings and policy implications of the study have been presented in the final section.

CHARACTERISTICS OF LAHORE

Socio-Economic Characteristics

Lahore is the capital and most advanced district of

Punjab province and almost 81.7 % population is urban (Faiza and Jamal, 2009). Current population of Lahore is almost 8.65 million increasing at a growth rate of almost 3% per year. The vehicle growth rate has reached 17% per year between 2004 and 2008 (JICA, 2012). Nowadays, Lahore citizens are showing a high trend of motorcycle ownership and usage, which tremendously increased by 483% during the past decade. Motorcycle almost accounts for 45 % of road traffic and 22.4 % of modal share (JICA, 2012). The share of motorcycle is almost two times of public transport in modal share and is even sometimes used as a family mode. Rapid increase in motorcycle usage has also threatened the safety of pedestrians and bicycle users. The main reasons of increase in automobile ownership and usage are the banking leasing policy of the government to own a car and the absence of an efficient public transportation system.

Public Transportation

Currently, public transportation is under-developed, highly fragmented and inefficient. More than 800,000 passengers are using public transport in Lahore where only 800 high occupancy buses are operating along with the concentration of para-transit service (JICA, 2012). Public transportation modes include: high occupancy bus, wagon or minibus, motorcycle rickshaw, auto-rickshaw and taxi. There are almost 53 planned routes for buses and 48 routes for wagons along with the concentration of motorcycle rickshaws on some routes. The public transportation modes constitute almost 20.1% of modal share (bus and wagon: 12.5%; rickshaws, taxi, 7.6%,... etc.) (JICA, 2012). High occupancy bus routes operate by many private operators such as Daewoo, Niazi, Malik, Baloch, First Bus,... etc. Auto-rickshaw and taxi are on demand modes, and their schedules and routes are not fixed. Motorcycle rickshaws have fixed routes but some of rickshaws are running on un-authorized routes due to lack of enforcement. Motorcycle rickshaw is very common in high density and low profile areas. Initially, provincial government was responsible to

own and operate public transport. However, from the past decade, the government has encouraged private operators to enter into market and run buses. Therefore, a large number of small private operators were permitted to fill the gap between passenger demand and capacity in a fragmented way. The incomplete routes, high fares, fewer buses, gender discrimination and even the absence of buses on some routes are common. Efficiency is acceptable on certain routes but reliability is poor, because there is no schedule at all. Public transportation has now become the privilege of private sector in the absence of human resources and financial capacity of public sector. Recently, local government has established Lahore Transport Company (LTC) to regulate public transportation system. Government of Punjab has taken various steps at different occasions to provide efficient and affordable public transportation for the public. In 1991, JICA proposed rail mass transit including the construction of light rail transit. This project has four lines; i.e., green line, blue line, orange line and purple line (Asian Development Bank, 2008). So far, this project has not been implemented due to financial and political issues.

Para-Transit Service

In this study, para-transit mode comprises of only wagon or minibus (15-20 seats) service. Currently, most of public transport users consider wagon service as best choice due to its flexible nature, temporal and spatial coverage. Wagon service has higher routes coverage and accessibility as compared to bus service. This service is mainly provided by some private companies or on individual basis. The schedule of wagon service is usually fixed, but sometimes drivers tend to delay operation because of fewer passengers. It has been observed that sometimes drivers take longer time at intermediate stops to get more passengers and cause delay to other passengers. It is noticed that many vehicles are operating without valid license, and many do not follow the authorized route and sometimes do not complete the full route journey. The terminals of

wagon service are located at different locations within urban areas. Some of the terminals are located near to main railway station and intercity bus terminals.

DATA COLLECTION METHODS

Questionnaire Design and Survey

A questionnaire was designed consisting of the following two parts: (1) personal and trip information, (2) level of satisfaction with service quality of wagon service. In part 1 of the questionnaire, frequency of travel with different modes and for different trip purposes was asked using following scale: never, a few times a year, a few times a month, 1-2 times a week, 3-4 times a week and 5-7 times a week. A four point Likert scale was used for evaluation of satisfaction response on service quality attributes of wagon service; i.e., not satisfied, less satisfied, satisfied and totally satisfied. The questionnaire survey was conducted during September 2011 with the help of university graduate students and 631 samples obtained. The questionnaire was designed to know preferences of all mode users especially car and potential car users (e.g., existing motorcycle, rickshaw, public transport users,... etc.). Last question in Table 1 was evaluated using four point Likert scale; i.e., strongly disagree, somewhat disagree, somewhat agree and strongly agree.

Distribution of Socio-economic Characteristics

Sample represents a good mix of different mode users as well as different occupations. The female respondents are less because they do not drive motorcycle and also do not work in commercial sectors (e.g. business, shops,... etc.). Table 2 shows that 64.6% of respondents have education bachelor or above, which is much higher than actual literacy rate in Lahore. This is, because the majority of car and potential car users belong to medium to high income category in this study and thus the education level also increases with the increase of income. Almost 50% of respondents have never experienced wagon or minibus service. The modal share in this study is calculated

based on highest frequency of travelling with a particular mode. Initially, sample was classified into four classes for vehicle ownership; i.e., no vehicle, only motorcycle, both car and motorcycle and only car. Then, a cross analysis was conducted between the four groups of vehicle ownership and modal share (most frequent travel mode). This analysis depicts that people having car or motorcycle prefer to use their private vehicle instead of any other mode as shown in Figure 1. This may be due to inefficient public transportation

and lower travel cost of motorcycle. In Lahore, it is believed that travel cost by motorcycle is almost half of public transportation in addition to its flexibility and convenience. From this cross analysis, four segments were identified; i.e., car oriented (204), motorcycle oriented (224), public transport oriented (145) and non-motorized oriented (58). These four segments were used to make comparison for satisfaction with service quality of wagon service and preferences to use public transportation.

Table 1. Attributes of service quality of wagon service

1	Route coverage (RC)	2	Punctuality of service (PS)
3	Travel time reliability (TTR)	4	Frequency of service (FS)
5	Travel cost (fare)-(TC)	6	Crew attitude (driver& conductor)-(CA)
7	Safety and security at stop and travelling (SS)	8	Waiting time at wagon stop (WTWS)
9	Comfort level (comfort)	10	Convenience level (CL)
11	Physical conditions of vehicle (PC)	12	Routes and schedule information (RSI)
13	Walking time to access stop (WTS)	15	Physical conditions of wagon stop (cleaning, lightening,... etc.)- (PCS)
14	Ticket and fare collection system (TFS)		
16	Overall performance of wagon service		
17	Even if I have or will own a car, I do/would use public transportation sometimes.		

Note: All attributes of service quality of wagon were evaluated using four point Likert scales: not satisfied, less satisfied, satisfied and totally satisfied. Statement no. 17 was evaluated using four- point level of agreement scale: strongly disagree, somewhat disagree, somewhat agree and strongly agree.

ANALYSIS OF PERCEPTIONS TO WAGON SERVICE

Comparison for Satisfaction with Wagon

A comparison was made between identified four segments of respondents for satisfaction with wagon service. This comparison as presented in Table 3 was made on average satisfaction as well as taking “*satisfied*” as threshold satisfaction point from four point ordinal scale. The satisfaction level is represented by ‘■’ and more ‘■’ means higher satisfaction with the corresponding attributes. Table 3 shows that public transport users are highly satisfied with most of the attributes of wagon service except convenience level, ticket and fare collection system, travel time reliability and service frequency. This is because drivers sometimes take more time at the intermediate stop, and

stop at other than fixed stop to take more passengers. In addition, sometimes vehicle crew stop operation at any stage of trip because of few passengers. These factors cause an increase in travel time and inconvenience to the passengers. Moreover, due to absence of proper fare structure and monitoring system, sometimes conductors demand higher fare from the passengers. The comparison also shows that car-oriented respondents have lower satisfaction with most of the attributes. After public transport users, motorcycle and non-motorized modes' users have much higher satisfaction with some service quality attributes. Motorcycle users are less satisfied with ticket and fare collection system, punctuality, travel time reliability, service frequency, crew attitude, walking time and physical condition of bus stop. They are satisfied with some attributes but they do not use buses because

Table 2. Descriptive statistics of socio-economic characteristics

Characteristic	Description of category	Distribution (%)
Gender	Male	76.7
	Female	23.3
Age (years)	Under 20	14.4
	21-30	56.3
	31-40	20.0
	41-50	6.97
	Above 50	2.36
Education	Below high school	8.9
	High school	8.9
	Higher secondary school	11.9
	Diploma	5.7
	Bachelor and above	64.6
Occupation	Students	23.6
	Government employees	20.8
	Private employees	29.0
	Entrepreneurs	15.7
	Others [lawyers, labor... etc.]	10.1
Personal income per month (PKR: Pakistan Rupees)	Less than 10,000	37.3
	11,000-20,000	23.1
	21,000-30,000	16.0
	31,000-40,000	10.9
	41,000-70,000	7.3
	More than 70,000	5.4
Car ownership	No	52.9
	Yes	47.1
Motorcycle	No	31.1
	Yes	68.9
Most frequent travel mode (modal share)	Car	24.5
	Motorcycle	35.5
	Rickshaw/ taxi	10.1
	Public bus	9.6
	Public wagon/minibus	11.1
	Walk/bicycle	9.2
Experience with para-transit (wagon)	Never	50.5
	a few times a year	15.5
	a few times a month	15.2
	1-2 days a week	6.5
	3-4 days a week	6.1
	5-7 days a week	5.8

motorcycle offers higher flexibility, freedom and convenience in travelling. Non-motorized mode users have less satisfaction with safety and security, waiting time, travel cost, vehicle physical condition and route and schedule information. This means that such people

do not use wagon service because they feel that it is expensive and less safe and secure. A ranking was proposed for satisfaction with wagon service and ranking placed public transport group at first, motorcycle users second, NMM users third and car

users fourth. It is believed that car users generally perceive less satisfaction with public transport modes and evaluate considering worst scenario (Beirao and Cabral, 2007); i.e., car users always consider worst

service quality level of public transport in evaluation in comparison to private cars. They do not look at the actual service quality of public transportation.

Table 3. Distribution of different mode users' satisfaction with wagon service quality

Attribute	Car-oriented (N: 204)	Motorcycle-oriented (N:224)	Public transport users (N: 145)	Walking/ bicycle users (N: 58)
Route coverage	■	■■■	■■■■	■■
Punctuality	■	■■	■■■■	■■■
Travel time reliability	■	■■	■■■	■■■■
Service frequency	■	■■	■■■	■■■■
Travel cost (fare)	■	■■■	■■■■	■■
Crew attitude	■	■■	■■■■	■■■
Safety and security	■■	■■■	■■■■	■
Waiting time at bus stop	■■	■■■	■■■■	■
Comfort level	■	■■■	■■■■	■■
Convenience level	■	■■■■	■■	■■■
Vehicle physical condition	■	■■■	■■■■	■■
Routes and schedule information	■	■■■	■■■■	■■
Walking time to bus stop	■	■■	■■■■	■■■
Physical condition of stop	■	■■	■■■■	■■■
Ticket and fare collection system	■■	■	■■■	■■■■
Overall evaluation of performance	■	■■■	■■■■	■■

Note: More '■' means higher satisfaction with wagon service attribute, N: number of samples.

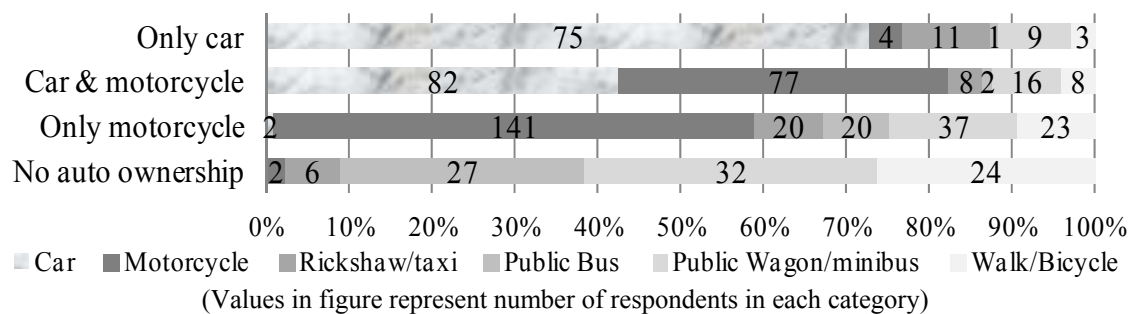


Figure 1: Cross-distribution of most frequent travel modes with vehicle ownership

Factor Analysis

A factor analysis was conducted using results of commuters' perceptions to service quality of wagon service. Three factors were identified using SPSS

software. These factors were named considering nature of attributes and tendencies associated with them from users' perspective; i.e., *symbolic*, *functional*, and *cost and time* as presented in Table 4. The indicators or

observed variables with higher factor loading have more influence in explaining the corresponding factor. The symbolic factor included satisfaction attributes related to image, aesthetics and attractive dimensions of service quality; i.e., comfort, safety, vehicle physical condition, staff attitude and information. The functional factor included attributes related to instrumental dimensions of service quality of public transportation; i.e., punctuality, route coverage, service frequency and convenience. It was assumed that time-related attributes such as walking and waiting time, and

travel time have monetary nature or value from user perspective. Therefore, third factor was named as cost and time factor. The Cronbach's alpha values were also estimated for the three extracted factors. These values are 0.81, 0.73 and 0.62 for symbolic, functional and cost and time factors, respectively. These values indicate that there is significant consistency among respondents in evaluating the observed variables of extracted factors, and these factors are reliable in estimating their impact on commuters' satisfaction and preferences.

Table 4. Rotated factor loading for perceptions to service quality attributes of wagon service

Factors	Observed variables	Factor loading	Cronbach's alpha
Symbolic	Comfort level (Comfort)	0.726	0.81
	Physical condition of vehicle (PC)	0.696	
	Crew attitude (CA)	0.655	
	Safety and security (SS)	0.608	
	Routes and schedule information (RSI)	0.480	
Functional	Punctuality of service (PS)	0.664	0.73
	Route coverage (RC)	0.656	
	Frequency of service (FS)	0.613	
	Convenience level (CL)	0.494	
Cost and time	Walking time to stop (WTS)	0.663	0.62
	Waiting time at wagon stop (WTWS)	0.519	
	Travel time reliability (TTR)	0.464	
	Travel cost (TC)	0.463	

Note: Variables with a factor loading of 0.4 or more are reported only. All the correlations were significant at 5% level of significance.

Structural Equation Modeling

In the field of transport and behavioral research, structural equation modeling (SEM) techniques have been widely used to evaluate travel behavior (Javid et al., 2012; Choocharukul, 2006; Golob, 2003; Steg, 2003) and different software packages are available for this purpose such as SPSS Amos 19.0 (Arbuckle, 2010). The SEM approach is handy for multivariate analysis. An SEM model includes measurement model, which identifies latent constructs underlying a group of observed variables, and/or structural equations which depict the directional relationships among latent and observed variables. An SEM model can handle a large number of endogenous and exogenous observed

variables as well as latent variables specified as linear combinations of the observed variables (Golob, 2003). It has the ability to test multiple hypotheses at one time with multiple dependents, provides flexibility in assumptions and can illustrate direct effects between variables and indirect effects through mediating variables. Different researchers in the field of statistics have recommended permissible values for parameters of goodness-of-fit of an SEM model. As the ratio of chi-square to the degree of freedom (χ^2/DF) less than 5 indicates a reasonable fit of model (Marsh and Hocevar, 1985), GFI, AGFI and CFI greater than 0.90 indicate good fit of model (Bentler and Bonett, 1980), RMSEA less than 0.08 shows a good fit (MacCallum *et*

al., 1996), and RMR less than 0.08 is acceptable (Hu and Bentler, 1999).

The structures of commuters' satisfaction with wagon service and preferences to use public transport were constructed using three factors as extracted in previous section. These two models are given in Figure 2. Two types of structural models were developed in this section: (1) structure of commuters' satisfaction with service quality of wagon service, (2) structure of influence of extracted satisfaction factors on commuters' preferences "to use public transportation

even if they have a car or will own a car". The first model was constructed to evaluate the influence of extracted satisfaction factors on commuters' overall satisfaction with wagon service. The objective of the second type model is to check how commuters' satisfaction with service quality factors of a particular mode influences their preferences to use public transportation. Comparison was made between structural models of car, motorcycle and public transport users for only estimates of structural equations and indices of goodness of fit parameters.

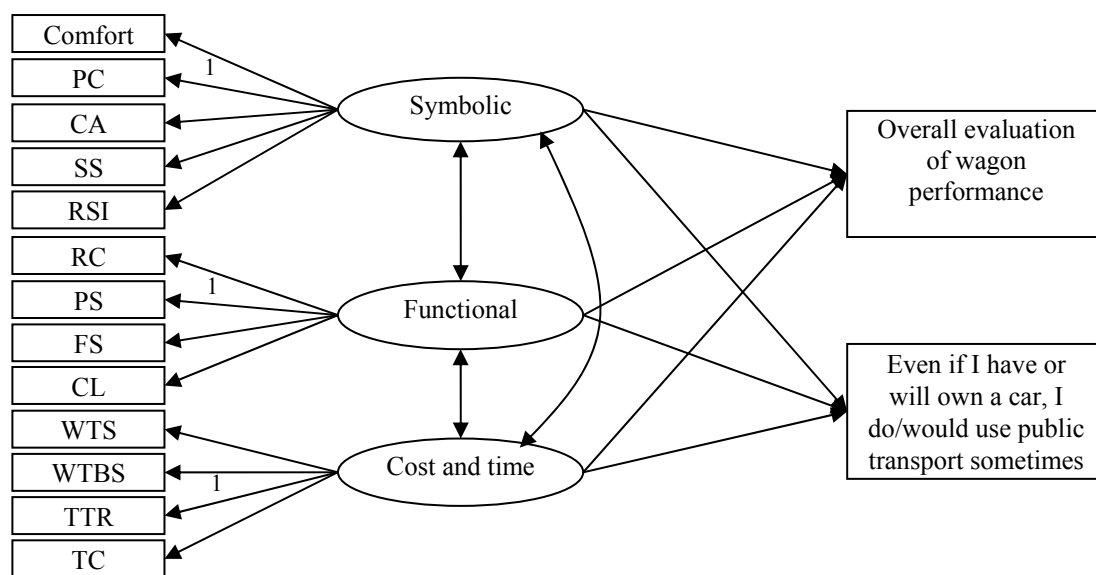


Figure 2: Structure of satisfaction and preferences with wagon service

Structural Models of Satisfaction with Wagon Service

The structures of commuters' satisfaction with wagon service were constructed using extracted factors; i.e., symbolic, functional, cost and time. An observed variable of commuters' "overall evaluation of wagon performance" was introduced for this purpose. A typical path diagram is presented in Figure 2 with the above defined observed variables. Four models were constructed and their parameters were estimated; i.e., base model (overall satisfaction model including all kinds of respondents; i.e., model with all samples),

car users' model, motorcycle users' model and public transport users' model. The results of structural equation modeling as presented in Table 5 show that commuters' satisfaction has positive relationship with the change of satisfaction with symbolic and functional factors. However, the satisfaction level decreases with the increase in travel cost and time factors. This means that commuters' satisfaction would reduce with the increase in fare, waiting and ingress/egress time. These results implicate that commuters' satisfaction with public transportation modes can be enhanced by improving the image of symbolic and functional

factors, but ensuring the low travel cost. Talking about individual model, in all models cost and time factor has negative impact on commuters' satisfaction whereas symbolic and functional factors have positive relationship with overall satisfaction of wagon service quality. These results imply that the increase in in-vehicle and out-of-vehicle travel time as well as travel

cost results in a negative impact on people's satisfaction regardless their travel mode. By comparing estimates of structural equations and values of goodness-of-fit parameters of three models with base model, it can be argued that the models of public transport and motorcycle users have better representation of overall base model.

Table 5. Results of standardized estimates of commuters' satisfaction models

Structural equations	Base model	Car users	MC users	PT users
Symbolic ---> Overall evaluation of performance	0.33**	0.43	0.23	0.21
Functional ---> Overall evaluation of performance	0.87	0.74	0.73	0.93
Cost and time ---> Overall evaluation of performance	-0.58	-0.55	-0.32	-0.57
Indicies of goodness of fit parameters				
Chi-Sq/DF	4.262	2.993	2.257	2.412
RMR	0.042	0.050	0.046	0.055
GFI	0.928	0.880	0.901	0.882
AGFI	0.895	0.825	0.855	0.828
CFI	0.914	0.855	0.903	0.877
RMSEA	0.072	0.099	0.075	0.084

Note: Base mode: overall satisfaction model with all samples, ** significant at 5%, PT: public transport, MC: motorcycle.

Table 6. Results of standardized estimates of commuters' preferences models

Structural equations	Base model	Car users	MC users	PT users
Symbolic ---> Even if I have or will own a car, I do/would use public transportation sometimes	0.16	-0.16	0.38**	0.11
Functional ---> a car, I do/would use public transportation sometimes	0.36	0.93	-0.69	0.47
Cost and time ---> transportation sometimes	-0.45	-0.60	0.42	-0.67
Indicies of goodness of fit parameters				
Chi-Sq/DF	4.061	2.730	2.127	2.243
RMR	0.042	0.052	0.047	0.065
GFI	0.931	0.888	0.904	0.863
AGFI	0.900	0.837	0.860	0.800
CFI	0.911	0.862	0.904	0.838
RMSEA	0.070	0.092	0.071	0.093

Note: Base mode: overall preferences model with all samples, ** significant at 5%, PT: public transport, MC: motorcycle.

Structural Models of Preferences to Use Public Transportation

In this part, again four structural models were developed for commuters' preferences to use public transportation using three extracted factors. For this purpose, an observed variable was defined as "Even if I

have or will own a car, I do/would use public transportation sometimes". Results of base model (overall model with all samples) as presented in Table 6 indicate that commuters' preferences to use public transportation have positive relationship with symbolic and functional factors. On the other hand, preferences

to use public transportation are affected negatively with the increase of cost and time factors. These results imply that commuters' preferences with public transportation modes can be enhanced by improving the image of symbolic and functional factors, but ensuring low travel cost.

The estimated parameters of structural equations for different modes' users show that the preferences to use public transport vary under different factors. In the model of car users, the preferences to use public transport are negatively affected by symbolic as well as cost and time factors; whereas they are positively associated with functional attributes. It means that the increase in in-vehicle and out-of-vehicle travel time and bad image of symbolic attributes tend to reduce the usage potential of car users. These results imply that the image of symbolic and time dimensions of wagon service needs to improve from car users' perspective; i.e., decrease in in-vehicle and out-of-vehicle travel time, improvement of comfort level, better vehicle condition, better safety dimensions and attitude of crew. Moreover, improvements in functional characteristics would also help in improving the image of the service to car users, as their relationship is positive with preferences. In the model of motorcycle users, satisfaction with symbolic as well as cost and time dimensions of wagon has positive influence on motorcycle users' preferences to use public transport. The relationship between functional attributes and preferences is negative. This means that lower satisfaction of motorcycle users with these attributes tends to reduce the use of public transportation. These results imply that functional dimensions of wagon service need to improve from the perspective of motorcycle users in order to improve their satisfaction and enhance usage of wagon service. In the model of public transport users, the preferences to use public transportation have positive relationship with the change of satisfaction with symbolic and functional factors. On the other hand, preferences to use public transportation decrease with the increase of cost and time factors. These results imply that higher

satisfaction of public transport users with symbolic and functional factors tends to generate more usage of public transport. However, the impact of travel cost and time factors needs to reduce from the perspective of transit users. The indices of goodness of fit parameters of all models as given in Table 6 are lying within or approaching permissible limits, which indicates that these models have reasonably good fit in estimating the respondents' perceptions.

By comparing the results of separate models with the base model, it can be said that the model of public transport users has better resemblance with the base model and that they have more potential of using public transport with the above-mentioned improvements in service quality because they have low potential of owning a private car in the future due to low income. Moreover, to attract auto users towards public transport, some significant improvements are required in all dimensions of public transport.

CONCLUSIONS

This study was conducted to evaluate commuters' satisfaction and preferences with public transportation and make a comparison between different mode user segments for stated subjects. It is found that public transport users are highly, motorcycle and non-motorized modes' users moderately, and car users less satisfied with most of the service quality attributes of wagon service. Structural equation modeling results revealed that commuters' satisfaction and preferences with public transportation modes are affected positively by the change of satisfaction with symbolic and functional factors. However, cost and time factors have negative impact on commuters' satisfaction and preferences. Therefore, major steps are required in order to improve the service quality of wagon service. It is suggested to improve symbolic and functional dimensions of wagon service along with reduction in cost and time factors in order to make it suitable for users of all types. Such improvements would be handy in increasing public satisfaction and usage of wagon

service.

It is revealed from comparative structural modeling that satisfaction of different mode users varies with wagon service and that models of public transport and motorcycle users have better resemblance with the base model. These results imply that current public transport and potential users (motorcycle users) should be the target groups in making improvements in service quality. Moreover, the perceptions of current and potential users are more important for evaluation of service quality of public transportation modes. Similarly, modeling results for preferences to use public transport revealed that model of public transport users has good representation of the overall base model. This implicates that improvement in symbolic and functional features of wagon service with affordable travel cost would help in keeping existing public transport users. This would also be helpful in enhancing the use of public transportation by attracting

the auto users. The developed structural models can be used to evaluate the commuters' satisfaction and preferences with other public transportation modes; e.g. bus service. This study would help transport planners in taking necessary steps for the improvement of wagon service quality as per satisfaction and preferences of different modes' users. It will also help in explaining the important attributes that need to be considered in developing public transportation facilities.

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